

Injuries in Indiana: Preventing Motor Vehicle Collisions



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**Indiana State
Department of Health**

Division of Trauma and Injury Prevention



Mission: To develop, implement and provide oversight of a statewide comprehensive trauma care system that

- Prevents injuries.
- Saves lives.
- Improves the care and outcomes of trauma victims.

Vision: Prevent Injuries in Indiana

Division of Trauma and Injury Prevention Staff



- Katie Gatz
 - Interim Director
- Camry Hess
 - Trauma Registry Data Analyst
- Murray Lawry
 - EMS Data Manager
- Jessica Skiba
 - Injury Prevention Epidemiologist

Objectives



- Identify the scope of motor vehicle collision (MVC) injuries in Indiana and U.S. in terms of:
 - Hospital Admissions
 - Emergency department (ED) Visits
 - Death
- Examine characteristics of MVC injuries
- Describe major risk and protective factors and demonstrate the ability to apply varied approaches to prevention

What is an Injury?



- Failure of tissue or a body part due to transfer of energy
 - Mechanical (majority)
 - Thermal
 - Electrical
 - Chemical
 - Ionizing radiation
- Injury results when energy load absorbed by body exceeds tolerance threshold
- Affect all regardless of age, race, or economic status

What is Injury?



- Injuries are **not** accidents!
- Accident: An unexpected occurrence, happening by chance
- Injury: A definable, correctable event, with specific risks for occurrence

Mechanism & Intent of Injury



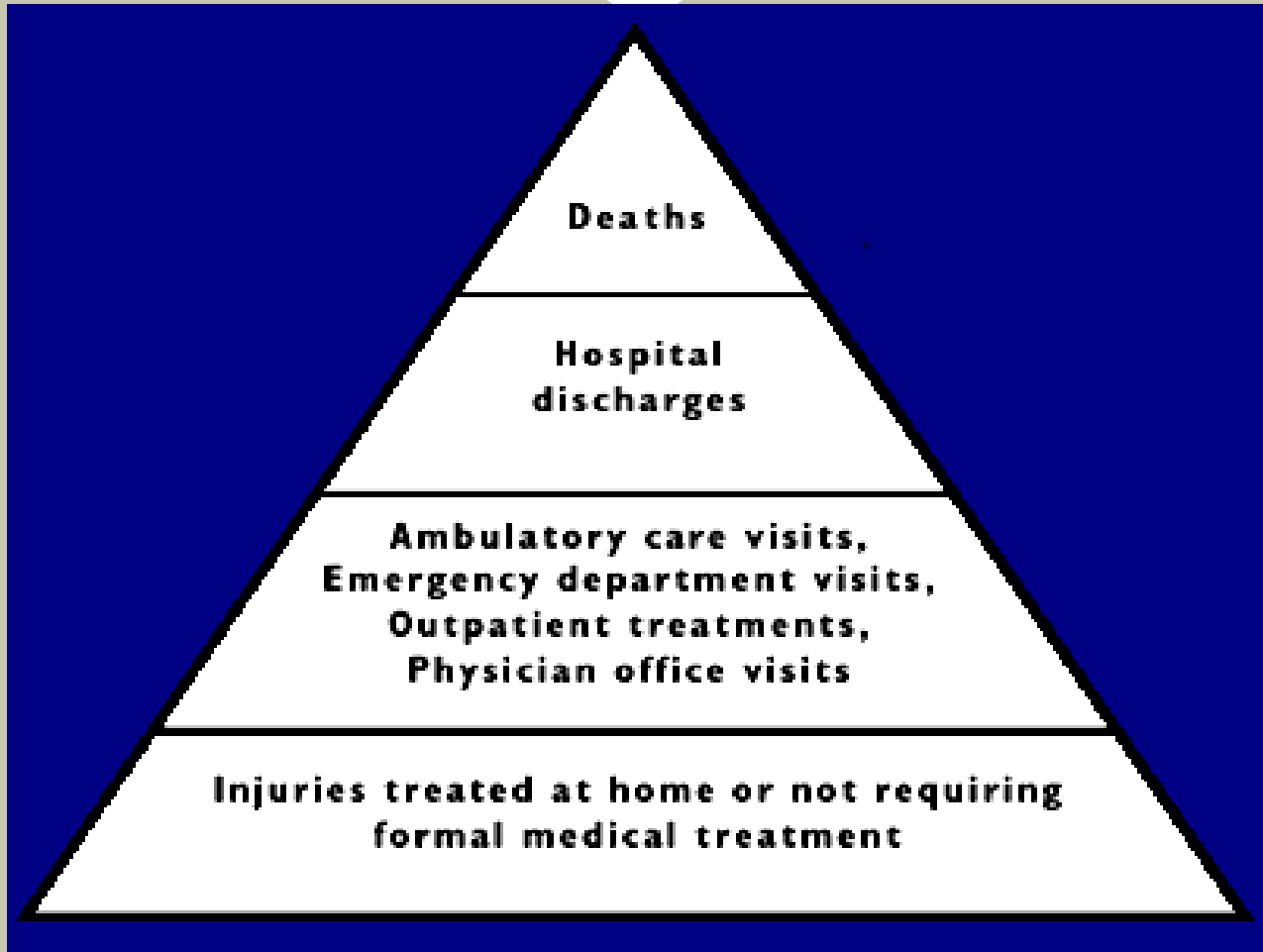
- **Mechanism:**

- Motor Vehicle Collisions
- Falls
- Firearms
- Fire/Burns/Scalds
- Poisoning
- Overexertion
- Struck By/Against

- **Intent:**

- Unintentional
- Self-inflicted/Suicide
- Assault/Homicide
- Undetermined
- Other

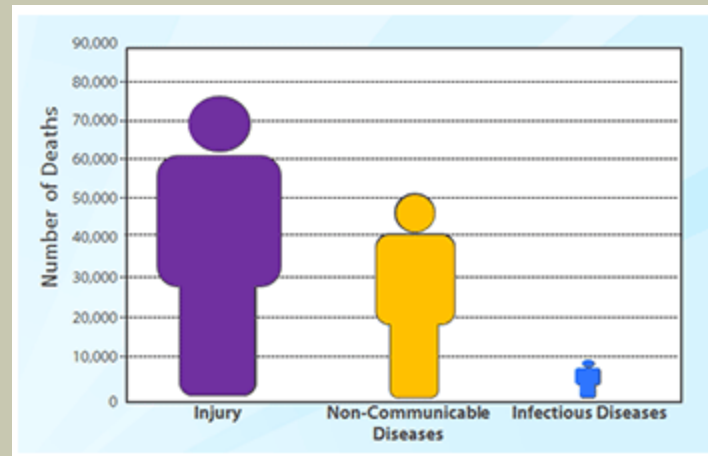
Injury Pyramid



Injuries in the United States



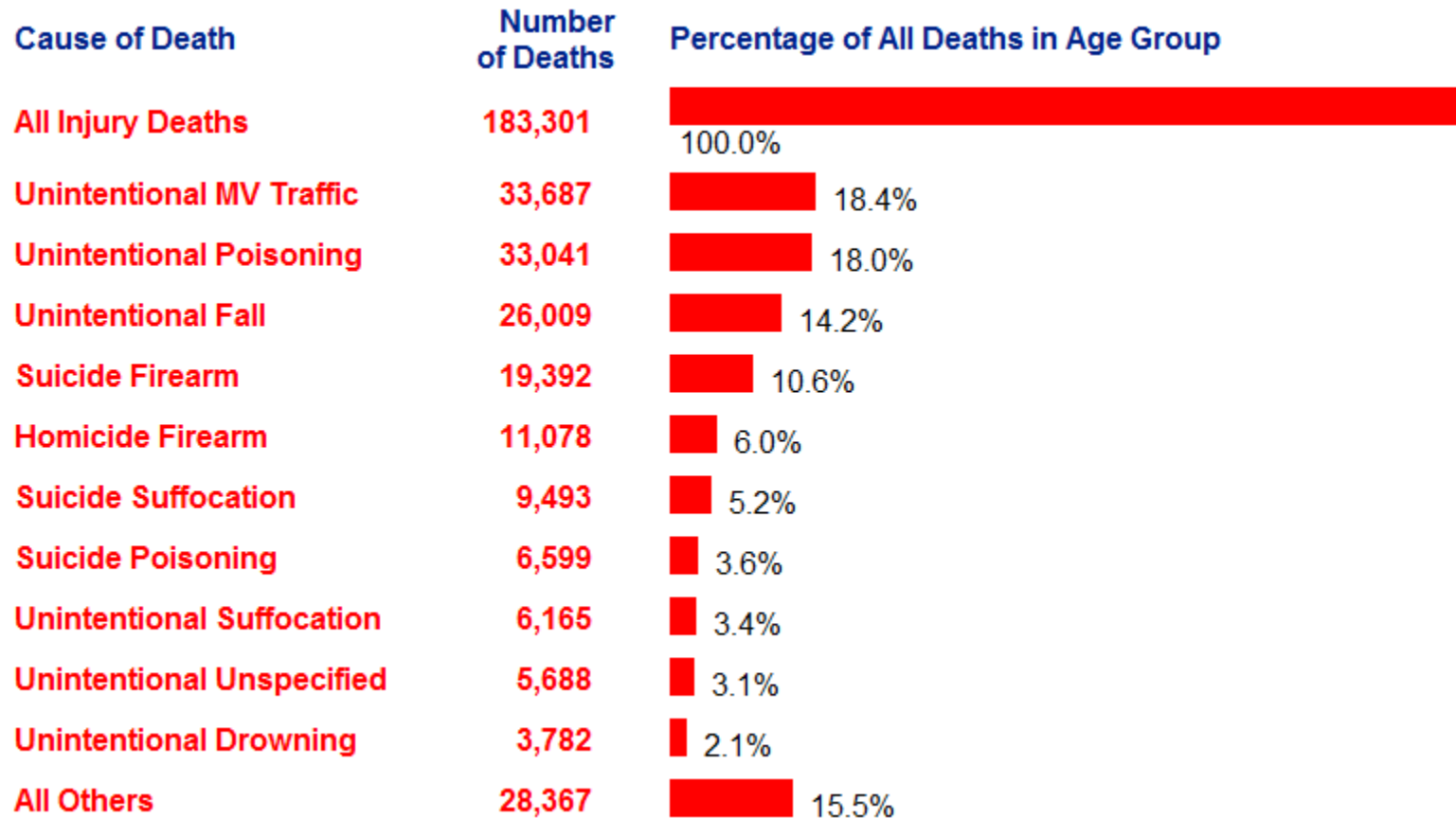
- More than 180,000 deaths per year²
 - 1 person every 3 minutes²
- 2.5 million people hospitalized each year²
- 31.6 million treated in ED each year²
- \$406 billion in medical care and lost productivity each year³



2) CDC. *Web-based Injury Statistics Query and Reporting System (WISQARS)* (Online) (2012). National Center for Injury Prevention and Control, CDC. Available from URL: <http://www.cdc.gov/injury/wisqars/index.html>.

3) Finkelstein EA, Corso PS, Miller TR, Associates. *Incidence and Economic Burden of Injuries in the United States*. New York, NY: Oxford University Press; 2006.

10 Leading Causes of Injury Deaths, US, 2010



Injuries in Indiana



- Number 1 killer of residents age 1-44 years
- More than 4,000 died from injuries in 2011
 - Fifth leading cause of death overall
 - Contributes to nearly 7% of all deaths in IN
- Nearly 34,500 hospitalizations for all injuries in 2011
- Unintentional injuries leading cause of Years of Potential Life Lost

Definition of Motor Vehicle Traffic Collision



- Injury resulting from any vehicle incident known or assumed to be traveling on public roads, streets, or highways
- Vehicle:
 - Automobile
 - Vans
 - Bus
 - Trucks
 - Motorcycles
 - Other Motorized Vehicles

Definition of Motor Vehicle Traffic Collision



- Injury resulting from any vehicle incident known or assumed to be traveling on public roads, streets, or highways
 - Incident:
 - Collision
 - Loss of Control
 - Crash
 - Other Event

MVT Injured Persons



- Injured person varies by event
 - Motorcyclist
 - Occupant
 - Pedal Cyclist
 - Pedestrian
 - Unspecified

Energy Transfers



- Three different collisions occur during an MVC event:
 - Vehicle Collision
 - Human Collision
 - Internal Organ Collision
- Energy is transferred at every stage of the crash
- Injury prevention goal to spread out energy transfer over time and space

MVC Injuries in the US



- Every 10 seconds someone in U.S. injured in MVC requiring treatment in an ED⁵
- Every 12 minutes someone dies in MVC on U.S. road⁵
- Nationally, MVC leading cause of death among ages 5-34²
- Leading cause of death among children^{2,6}
 - A third of children who died in crashes in 2011 were not buckled up⁶

2) CDC. *Web-based Injury Statistics Query and Reporting System (WISQARS)* (Online) (2012). National Center for Injury Prevention and Control, CDC. Available from URL: <http://www.cdc.gov/injury/wisqars/index.html>.

5) CDC. *Save lives, save dollars. Prevent motor vehicle-related injuries.*(2010). National Center for Injury Prevention and Control, CDC. Available from URL: <http://www.cdc.gov/injury/pdfs/cost-MV-a.pdf>

6) CDC. *Child passenger safety fact sheet.* U.S. Department of Health and Human Services, CDC. Available at http://www.cdc.gov/motorvehiclesafety/child_passenger_safety/cps-factsheet.html.

MVT Injuries in Indiana

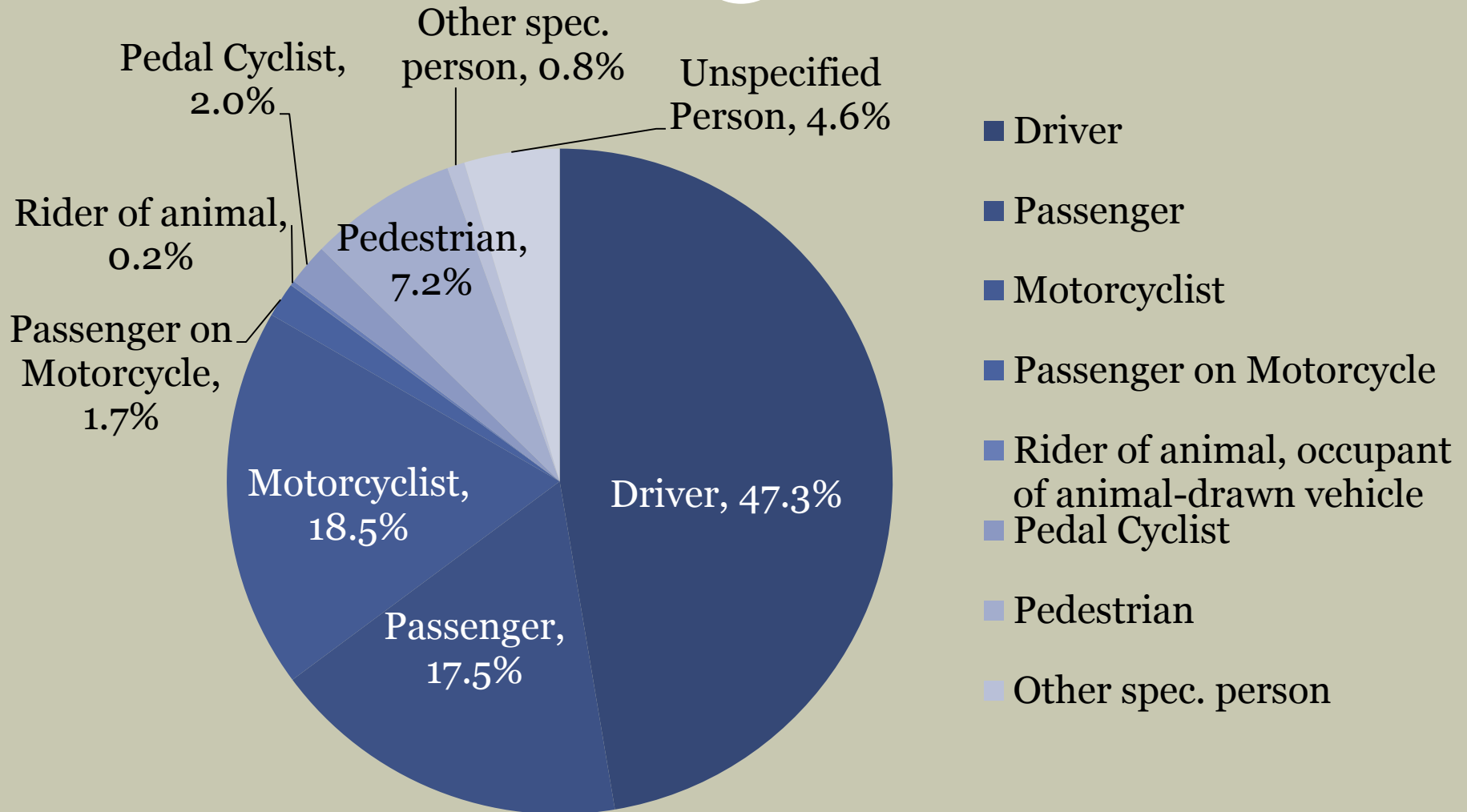


- 3,166 hospitalizations in 2012 at an age-adjusted rate of 48.3 per 100,000⁴
- 36,570 emergency department visits in 2012 at an age-adjusted rate of 568.9 per 100,000⁴
- 777 total deaths from 703 crashes in 2013⁷

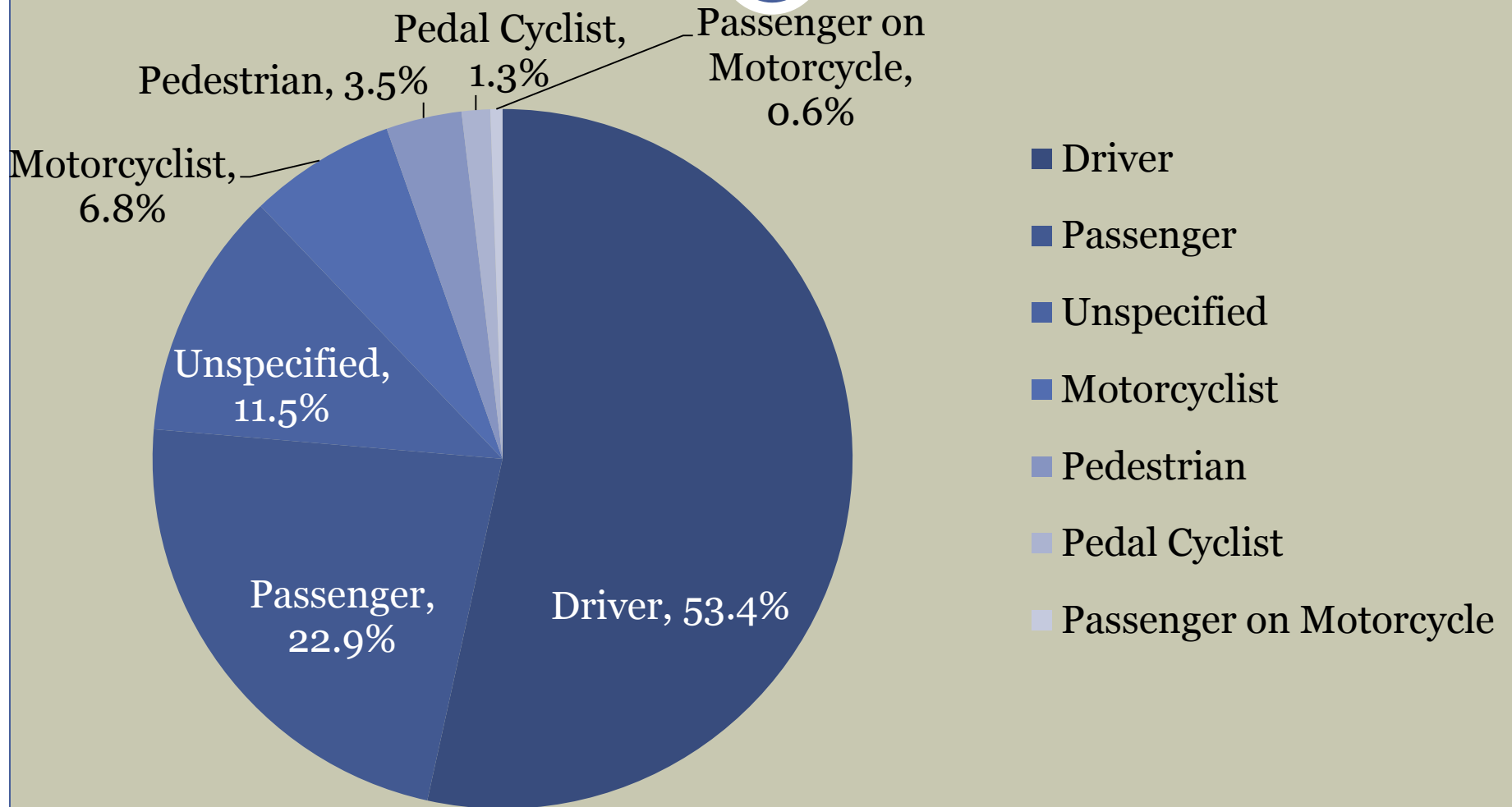
⁴)Indiana State Department of Health, Epidemiology Resource Center, Data Analysis Team.

⁷) Indiana State Police, Fatality Analysis Reporting System (FARS).

Hospital Admissions for MVC by Injured Person, Indiana, 2011-2012



ED Visits for MVC by Injured Person, Indiana, 2011-2012



Risk and Protective Factors



Risk factors:

- Conditions or situations that increase the likelihood of future injury

Protective Factors

- Conditions or situations that decrease the likelihood of future injury

Risk Factors for Motor Vehicle Collisions



- Impaired Driving
 - Drunk Driving
 - Drugged Driving
- Speeding
- Risk Taking Behaviors
- Drowsy Driving
- Distracted Driving
 - Cell phones/ GPS
 - Passengers
 - Multitasking
- Inexperience
 - Inadequate Driving Skills
 - Poor Defensive Driving Skills

Risk Factors



- Risk factors that are modifiable
 - Safety belt use
 - Drinking and driving
 - Distracted Driving

- Risk factors that are not modifiable
 - Age
 - Gender
 - Weather
 - Time of day

Temporal Prevention Programs



- **Primary**: Prevents the occurrence of an injury
 - Pre-event phase: Speed limits, improved car engineering
 - Reduces level of exposure or risk factor
- **Secondary**: Identify & control injury process early
 - During event: Seat Belts, airbags, LATCH-system
- **Tertiary**: Strategy to prevent disability by restoring individuals to optimal level of functioning
 - Post-event: Rehabilitation

Injury Prevention: Proven Policy Solutions



- Reduce Alcohol-Impaired Driving
- Increase Safety Belt Use
- Improve Child Passenger Safety
- Improve Teen Driver Safety



Seatbelt Use



- Restrains a grown child or adult in crash
- Using seat belts reduces serious injuries and death in MVCs by ~50%^{8,9}
- Positioned over the strongest parts of the body⁹
 - Lap belt across upper thighs
 - Shoulder belt across shoulder and chest
- Pregnant women recommended to wear seat belt



8)Thomas KE, Johnson RL. *State injury indicators report: Instructions for Preparing 2011 Data*. Atlanta, GA: U. S. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2013.

9)Centers for Disease Control and Prevention. *Child passenger safety fact sheet*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at http://www.cdc.gov/motorvehiclesafety/child_passenger_safety/cps-factsheet.html

Child Passenger Safety



- Indiana State Law requires use of a car seat or booster seat for children 7 years of age or younger
- Child restraint use is the most effective method for reducing MVC-related death in children⁶
 - Age & size appropriate
 - Use every car trip, regardless of distance

Child Passenger Safety



- Children ≤ 12 safest when properly restrained in back seat¹⁰
 - Middle of back seat is the safest for some vehicles
 - Airbags kill children riding in front seat
- Booster seats position seat belt to fit properly for smaller bodies

Use of Child Safety Seats Not Enough



- Must be installed correctly
 - 3 out of 4 car seats not used correctly
- Safety seat should not shift more than one inch side to side or front-to-back when pulled¹¹
 - At or near the vehicle belt path
 - At path designated for the lower anchor straps
- Safety harness must fit child snugly
- Chest clip at armpit level

Age & Size Appropriate Car Seats & Booster Seats



REAR-FACING CAR SEAT

Birth up to Age 2*

Buckle children in a rear-facing seat until age 2 or when they reach the upper weight or height limit of that seat.



FORWARD-FACING CAR SEAT

Age 2 up to at least age 5*

When children outgrow their rear-facing seat, they should be buckled in a forward-facing car seat until at least age 5 or when they reach the upper weight or height limit of that seat.



BOOSTER SEAT

Age 5 up until seat belts fit properly*

Once children outgrow their forward-facing seat, they should be buckled in a booster seat until seat belts fit properly. The recommended height for proper seat belt fit is 57 inches tall.



SEAT BELT

Once seat belts fit properly without a booster seat

Children no longer need to use a booster seat once seat belts fit them properly. Seat belts fit properly when the lap belt lays across the upper thighs (not the stomach) and the shoulder belt lays across the chest (not the neck).

Birth up to Age 2



- Buckle in rear-facing seat until
 - Age 2 OR
 - Reach weight limit of seat, OR
 - Reach height limit of seat

The graphic includes a horizontal timeline at the top with markers for 'Birth', '1', '2', and '3'. Below the timeline is a horizontal bar with a color gradient from orange to purple. Below this is an illustration of a brown car seat with a white child seat buckled in, facing away from the viewer.

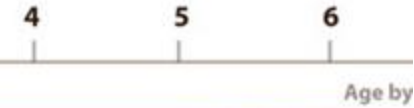
REAR-FACING CAR SEAT

Birth up to Age 2*
Buckle children in a rear-facing seat until age 2 or when they reach the upper weight or height limit of that seat.

Age 2 to At Least Age 5



- Children should be buckled in forward-facing car seats when outgrow rear-facing
 - Through at least age 5, OR
 - Reach weight limit of seat, OR
 - Reach height limit of seat



FORWARD-FACING CAR SEAT

Age 2 up to at least age 5*
When children outgrow their rear-facing seat, they should be buckled in a forward-facing car seat until at least age 5 or when they reach the upper weight or height limit of that seat.

Age 5 up to Seat Belt Fits Properly



- When outgrow forward-facing seats, children should be buckled in booster seats
 - Age 5 through proper seat belt fit
 - Use seat belt when 57 inches tall

7 8 9
Years*



BOOSTER SEAT

Age 5 up until seat belts fit properly*

Once children outgrow their forward-facing seat, they should be buckled in a booster seat until seat belts fit properly. The recommended height for proper seat belt fit is 57 inches tall.

Seat Belt Use



- No need for booster once seat belt fits properly
 - Lap belt lays across the upper thigh, not stomach
 - Shoulder belt lays across chest, not neck
- Keep children ages 12 and under in the back seat
- Continue seat belt use for rest of life

10 11 12+



SEAT BELT

Once seat belts fit properly without a booster seat

Children no longer need to use a booster seat once seat belts fit them properly. Seat belts fit properly when the lap belt lays across the upper thighs (not the stomach) and the shoulder belt lays across the chest (not the neck).

Lower Anchors and Tethers for Children (LATCH)



- LATCH makes it easier to install child safety seats
 - Ensures child safety seat is installed correctly
 - Provides same level of protection as seat belt install
 - Lower attachments on child safety seats and set of tether anchors to hold seat in place
- Required in almost all cars and child safety seats manufactured after 9/2002



Lower Anchors and Tethers for Children (LATCH)

- **Tether Anchor-** Hardware in vehicle to connect to top tether strap hook
- **Top Tether Strap-** Strap on top rear of child restraint to connect to tether anchor
- **Lower Anchors-** horizontal bar in vehicle seat bight to provide a secure anchor for the child restraint's lower attachments
- **Lower Attachments-** connects the child restraint to the lower anchor in vehicle



ANGLE GUIDE FOR REAR-FACING INSTALLATIONS



Lap Belt



Lap-Shoulder Belt



LATCH ≤ 40 lbs

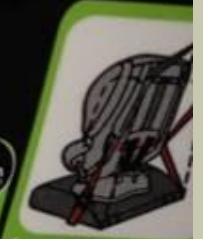
Child seat is correctly installed when line above is parallel to ground while vehicle is parked on a level surface.



Installation Information



LATCH ≤ 40 lbs



Lap-Shoulder Belt

REAR-FACING BELT PATH

INSTALLATIONS

Child seat is correctly installed when the line above is parallel to ground while vehicle is parked on a level surface.



Installation Information



FORWARD-FACING
BELT PATH

PSB0200

WARNING!

P580200_B:09.13



WARNING!

DEATH or SERIOUS INJURY can occur.

• Use only in a rear-facing position when using it with an infant weighing less than 20 lbs (9.1 kg). • Use only with children who weigh between 5 and 65 lbs (2.3 and 29.4 kg) and whose height is 49 in. (124.5 cm) or less. Rear-facing for children who weigh between 5 and 40 lbs (2.3 and 18 kg) and forward-facing for children who weigh between 20 and 65 lbs (9.1 and 29.4 kg). • Snugly adjust the belts provided with this child restraint around your child. • Secure the top anchorage strap provided with this child restraint. • Secure this child restraint with the vehicle's child restraint anchorage system if available or with a vehicle belt. • Follow all instructions on this child restraint and in the written instructions located in the pocket behind the cover. • Register your child restraint with the manufacturer. • Do not use the lower anchors of the child restraint anchorage system (LATCH system) to attach this child restraint when restraining a child weighing more than 40 lbs (18 kg) with the internal harnesses of the child restraint. • The provided infant positioning pillow must be used for children weighing 22 lbs (10 kg) or less in a rear-facing position. Do not use over 22 lbs (10 kg) or in a forward-facing position.



This child restraint system conforms to all applicable Federal Motor Vehicle Safety Standards.
This Restraint is Certified for Use in Motor Vehicles and Aircraft.

Britax Child Safety, Inc. • www.BritaxUSA.com • 1-888-427-4829 • 1-704-409-1699
Patent/Patente: www.britaxusa.com/patents
Manufactured in Fort Mill, SC, USA

Child Safety Seat Inspection



- Automotive Safety Program has a network of 121 Child Safety Seat Inspection Stations across the state of Indiana
 - Parents and caregivers can make an appointment
 - Free child safety seat inspections by certified child passenger safety technician
- 1-800-KID-N-CAR
- www.preventinjury.org
- Safecar.gov App available
- NHTSA's toll free Auto Safety Hotline 1-888-327-4236

NHTSA Proposed Upgrades to Federal Motor Vehicle Safety Standards



- Include side impact test for car seats for children weighing up to 40 lbs
 - Sled Test to simulate “T-bone” crash
 - 12 month old & 3 year old child dummies to be used
- Three year timeframe for car-seat manufacturers to meet proposed requirements
- Proposed test estimate to save five lives and prevent 64 injuries per year

Teen Driving



- Per mile driven, teen drivers are four times more likely than adult drivers to crash
- Risk Factors:
 - Driver inexperience
 - Driving with teen passengers
 - Nighttime driving
 - Drowsy Driving
 - Not wearing seat belt
 - Distracted driving

5 to Drive: Teen Driving



- Rule 1: No Cell Phones
- Rule 2: No Extra Passengers
- Rule 3: No Speeding
- Rule 4: No Alcohol
- Rule 5: Always Buckle Up

Distracted Driving



- Cognitive Distraction: Take mind off the road
- Visual Distractions: Take eyes off the road
- Manual Distractions: Take hands off the wheel

- Not all three have to occur for a driver to be dangerously distracted





Behind the wheel
there is
no such thing
as a small distraction.

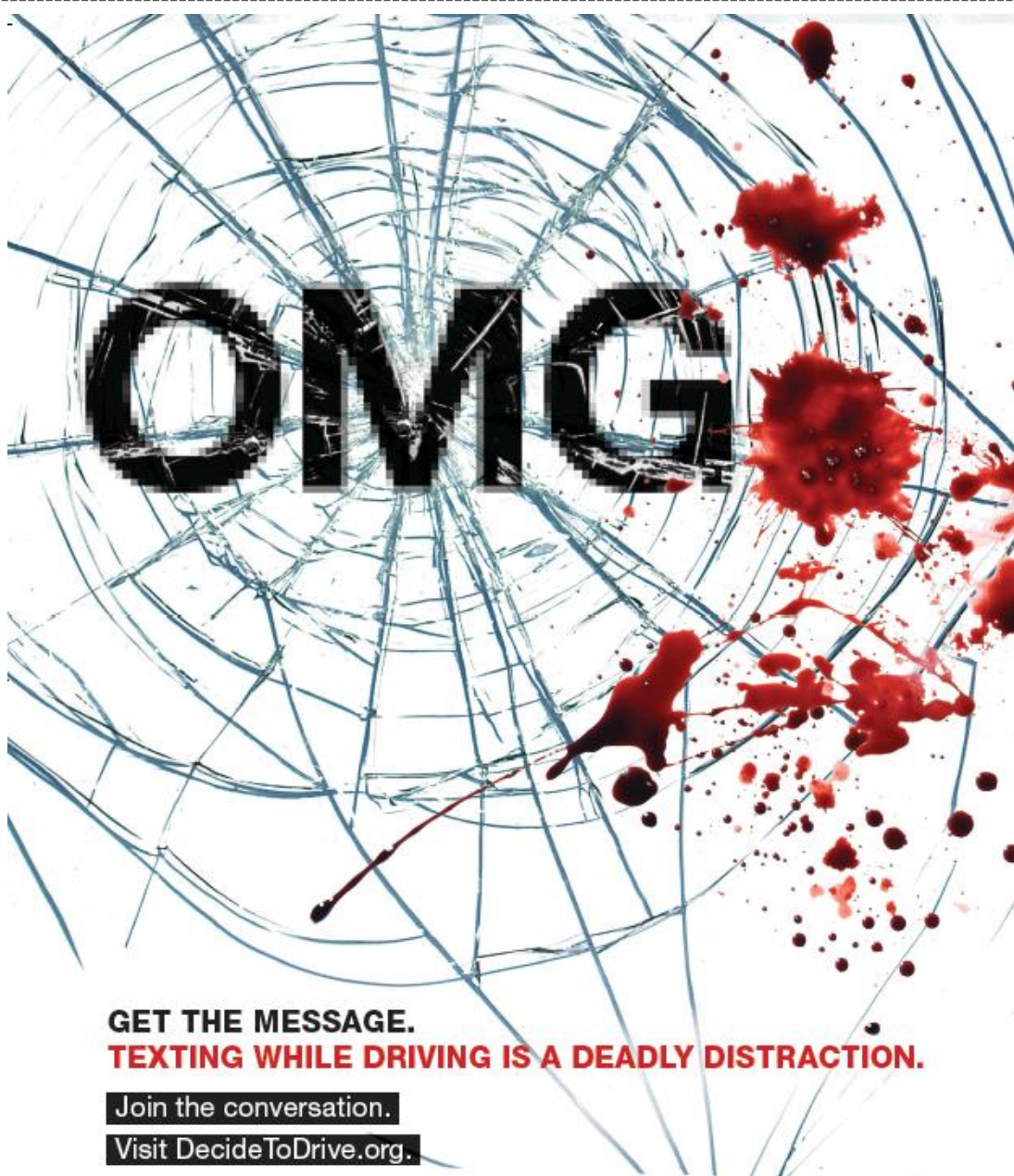
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DecideToDrive.org

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TEXTING WHILE DRIVING IS A DEADLY DISTRACTION.**

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Decide to Drive Campaign



- Consciously make a decision each and every time you get behind the wheel to make driving your priority:
- Before you start your car:
 - Fasten your seat belt
 - Adjust seats, head rests, vehicle controls and mirrors
 - Put on any accessories you may need
 - Pre-select a radio station, CD, or playlist and adjust volume level to not mask emergency sirens
 - Enter an information in the navigation system before you depart or review maps and written directions before you drive
- Stop your vehicle in a safe area to deal with distraction

U Drive. U Text. U Pay



- U.S. Department of Transportation National Distracted Driving Enforcement and Advertising Campaign

**U DRIVE.
U TEXT.**



#TXTL8RIN

Drive Now. TXT L8R



- April is Distracted Driving Awareness Month
- Social Media contest with \$5,000 scholarships
 - Indiana high school & college students eligible
 - Contest runs April 1-30, 2014
- Keeping one's hands on the wheel and eyes on the road is not just a safe driving practice – it's the law.
- www.txtl8r.in.gov



Collision Prevention



- Plan ahead. Allow yourself extra time.
- Use seat belts and car safety seats correctly and appropriately.
- Concentrate on driving
- Relax
- Get out of the way of aggressive drivers
- Drive the posted speed limit
- Identify alternative routes
- Use public transportation
- Accept being late

References



- 1) Adapted from Safe States Alliance (Formerly known as State and Territorial Injury Prevention Directors Association (STIPDA)): Safe States, 2003 Edition
- 2) Centers for Disease Control and Prevention. *Web-based Injury Statistics Query and Reporting System (WISQARS)* (Online) (2012). National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. Available from URL: <http://www.cdc.gov/injury/wisqars/index.html>.
- 3) Finkelstein EA, Corso PS, Miller TR, Associates. *Incidence and Economic Burden of Injuries in the United States*. New York, NY: Oxford University Press; 2006.
- 4) Indiana State Department of Health, Epidemiology Resource Center, Data Analysis Team.
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- 6) Centers for Disease Control and Prevention. *Child passenger safety fact sheet*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Available at http://www.cdc.gov/motorvehiclesafety/child_passenger_safety/cps-factsheet.html.
- 7) Indiana State Police, Fatality Analysis Reporting System (FARS).
- 8) Thomas KE, Johnson RL. *State injury indicators report: Instructions for Preparing 2011 Data*. Atlanta, GA: U. S. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control; 2013.
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- 10) Committee on Injury, Violence, and Poison Prevention. Child passenger safety. *Pediatrics*. 2011;127(4):788-93
- 11) National Highway Traffic Safety Administration (NHTSA). *Frequently Asked Questions: Latch Information*. Available at <http://www.nhtsa.gov/Safety/LATCH>.
- 12) National Highway Traffic Safety Administration (NHTSA) *Definitions: Latch Information*. Available at <http://www.nhtsa.gov/Safety/LATCH>.
- 13) Naylor, N. (2014). NHTSA proposes first-ever side impact test for child restraint systems. National Highway Traffic Safety Administration. Retrieved from <http://www.nhtsa.gov/About+NHTSA/Press+Releases/NHTSA+Proposes+First-Ever+Side+Impact+Test+for+Child+Restraint+Systems>
- 14) Insurance Institute for Highway Safety (IIHS). *Fatality facts: Teenagers 2008*. Arlington (VA): The Institute; 2009. Available from URL: www.iihs.org/research/fatality_facts_2008/teenagers.html.
- 15) Safercar.gov from U.S. Department of Transportation. Retrieved from <http://www.safercar.gov/parents/fivetodrive.htm>
- 16) Decide to Drive. American Academy of Orthopaedic Surgeons. Retrieved from <http://www.decidetodrive.org/>

Questions?



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